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Hotei et al.

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(54) **SHIFT POSITION DETECTING DEVICE**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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6,339,325 B1 * 1/2002 Oda F16H 59/70
324/207.2
6,683,263 B1 * 1/2004 Scheib F16H 59/70
200/61.88
2006/0160660 A1 * 7/2006 Zenno B60W 10/02
477/114
2010/0107792 A1 * 5/2010 Saitoh F16H 63/18
74/337.5
2010/0107796 A1 * 5/2010 Tomoda F16H 63/18
74/473.1

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FOREIGN PATENT DOCUMENTS

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JP 2011-196517 A 10/2011

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* cited by examiner

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(30) **Foreign Application Priority Data**

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(57) **ABSTRACT**

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A shift position detecting device where a shift position determining member is provided for determining a shift position based on a combination of switching modes of three switches corresponding to at least one of a plurality of projection rows each having a plurality of projection portions in a one-by-one basis, and "1, 1, 1" indicative of an ON state of each switch is allocated as a detection logic at a neutral position arranged between a first speed position and a second speed position, wherein a change in friction at the time of a shift operational to the neutral position is alleviated thus giving an operational feeling with no discomfort to a rider. Two projection rows that are objects to be detected by two specified switches among the three switches are formed so as to change switching modes of the specified switches from an OFF state to an ON state.

(52) **U.S. Cl.**
CPC **F16H 63/18** (2013.01); **F16H 59/70** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

20 Claims, 13 Drawing Sheets

